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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/630,338 | 07/30/2003 | Xiang Li | O1056/20008 | 8753 |
| 3000 | 7590 | 10/04/2005 | EXAMINER | |
| CAESAR, RIVISE, BERNSTEIN, COHEN & POKOTILOW, LTD. 11TH FLOOR, SEVEN PENN CENTER 1635 MARKET STREET PHILADELPHIA, PA 19103-2212 | | | LEADER, WILLIAM T | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1742 | |

DATE MAILED: 10/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/630,338 | LI ET AL. | |
| | Examiner | Art Unit | |
| | William T. Leader | 1742 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>11/3/2003</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 2 refers to "the longitudinal direction" and "the axial direction". These terms lack antecedent basis. No geometrical orientation of the elements recited in claim 1 has been specified. Similarly, claim 3 recites "the longitudinal bars" while claim 4 recites "the latitudinal bars". These terms lack antecedent basis. Claim 5 recites that an array of bars defines the adjacent anion exchange membrane and cation exchange membrane. It is not apparent how bars define a membrane.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1, 2, 5, 6 and 11-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (6,190,528) in view of Jha et al (4,062,756) or Deguchi et al (6,344,122).

6. Li et al discloses a helical electrodeionization apparatus. The apparatus includes an anion exchange membrane, a cation exchange membrane, a first electrode, a plurality of membrane bags formed by the anion exchange membrane and the cation exchange membrane and a second electrode. The membrane bag has a concentrate flow channel and a dilute flow channel is located adjacent the membrane bags.

7. Claim 1 differs from the apparatus of Li et al by reciting a frame having an array of bars which is arranged to support the dilute flow channel. The Jha et al patent is directed to a liquid flow distribution screen particularly suited as a membrane support and spacer in electrodialysis apparatus. As shown in figure 1 bar-shaped elements 10 extend in one direction which may be considered longitudinal while bar-shaped elements 14 extend in a transverse direction which may be considered latitudinal.

8. The Deguchi et al patent is directed to deionization apparatus. As shown in figure 1, the apparatus includes a partition member 21 which is positioned between an anion exchange membrane 24 and a cation exchange membrane 25. An ion exchange material 25 fills the space.

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The partition member corresponds to applicant's claimed frame. As shown in figures 3 and 9 the partition can be made up of a series of parallel bar-shaped members. See column 4, lines 45-59.

9. The prior art of record is indicative of the level of skill in the art. It would have been obvious at the time the invention was made to have included a frame having a array of bars in the apparatus of Li et al as taught by Jha et al or Deguchi et al because the anion and cation membranes would have been better supported. The features recited in claims 12-17 are disclosed by Li et al. See figures 1-3.

10. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (6,190,528) in view of Jha et al (4,062,756) or Deguchi et al (6,344,122) as applied to claims 1, 2, 5, 6 and 12-17 above, and further in view of Sanchez et al (4,437,967).

11. Claim 3 and 4 additionally recite dimensions. The Sanchez et al patent discloses a chamber which includes a frame 3 between two membranes 1 and 2. The frame includes parallel strips 23 which are in the shape of bars. The membranes rest against the faces of the strips and are kept in place without there being a significant risk of deformation (column 5, lines 18-21. Sanchez et al discloses that the spacing can be about 2 to 3 mm for maximum efficiency (column 5, lines 23-24). Choice of spacing of bars in a frame provided in the apparatus of Li et al as suggested by Jha et al or Deguchi et al would have been a matter of routine optimization to control flow and efficiency as taught by Sanchez et al. The 3 mm spacing of Sanchez et al falls within the range recited in instant claim 3

12. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (6,190,528) in view of Jha et al (4,062,756) or Deguchi et al (6,344,122) as applied to claims 1, 2, 5, 6 and 12-17 above, and further in view of Schneider patent (3,985,636).

13. Claims 7-10 recite various cross sections of the bar members. The Schneider patent is directed to electrodialysis apparatus and discloses rod shaped electrodes which have a circular cross section. Schneider teaches that the electrodes may take the form of tubes or bars and have any convenient cross-sectional configuration such as oval or polygon (column 3, lines 55-60). It would have been obvious to have provided bars in a frame in the apparatus of Li et al as suggested by Jha et al or Deguchi et al in a variety of cross section as taught by Schneider because bar-shaped components of an electrodialysis apparatus may usefully have any convenient cross-section.


14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Korngold patent (4,752,373) is directed to electrodialysis apparatus and shows in figure 3 spacer 42 which may be positioned between membranes. The spacer includes a plurality of plastic rods which are positioned in a first direction in spaced parallel relation and joined to a second layer of a plurality of rods position in a second direction is spaced parallel relationship (column 7, lines 11-23).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to William T. Leader whose telephone number is 571-272-1245. The examiner can normally be reached on Mondays-Thursdays and alternate Fridays, 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King, can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


William Leader
September 27, 2005


ROY KING
SUPERVISORY PATENT EXAMINER
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